

## A Universal Device for Performing Cricothyrotomies

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### Description:

**OBJECTIVE:** To develop an all-in-one universal device for performing cricothyrotomies to more effectively manage airway trauma in the battlefield. **DESCRIPTION:** A cricothyrotomy (or cricothyroidotomy) is an emergency procedure to establish an airway in a patient when intubation attempts are unsuccessful due to acute injury to the head and/or neck. Establishing an airway and restoring oxygen-flow to the brain is essential and is a time-sensitive process. Cricothyrotomy convenience kits are often assembled for use in pre-hospital situations, and contain the necessary instruments to perform the procedure. However, these kits are not standardized and vary from company to company. In November 2010, Military Health System's Committee on Tactical Combat Casualty Care (CoTCCC) published a list with preferred features for a surgical airway kit. Numerous publications have demonstrated that battlefield cricothyrotomies have been largely unsuccessful in Operation Enduring Freedom and Operation Iraqi Freedom. Due to the severity of injuries sustained in these environments, the procedures are generally performed by medics at the point of injury, though some were performed by physicians or physician assistants. TCCC recommends early consideration of cricothyrotomies because many medics are not experienced enough to perform successful intubation procedures. However, when looking at injuries and deaths in Iraq and Afghanistan, the procedures were more successful when performed by a physician or physician assistant than if performed by a medic, but still two-thirds of the patients died. Though it is hard to directly link a patient's death with a cricothyrotomy failure, the statistics reveal procedure, training, and device problems. As the third-most preventable cause of death on the battlefield, it is imperative to identify a solution to successful airway management. Training inconsistencies and lack of continuous practice suggest that an all-in-one device would greatly improve the outcome of the

procedure and reduce the number of instruments needed to package. The universal device would address the issues found in battlefield cricothyrotomies and be safe and intuitive to use. PHASE I: Phase I would consist of designing schematics and diagrams for a universal cricothyrotomy device, and providing a working prototype. A literature search would demonstrate that the device designed would address the complications of battlefield procedures and provide feasibility data. This phase would also address a potential regulatory path for gaining FDA approval or clearance. PHASE II: Phase II would consist of developing, demonstrating and validating the prototype and implementing the plan for FDA approval or clearance. This would include performing pivotal trials and device testing. PHASE III DUAL USE APPLICATIONS: Phase III would consist of developing training methods and protocols for the new device and performing Army-relevant testing, such as environmental testing and user studies. REFERENCES: 1. Mabry, RL."An Analysis of battlefield cricothyrotomy in Iraq and Afghanistan."J Spec Oper Med. 2012;12:17-23. 2. Bennet, Brad, et al."Cricothyroidotomy Bottom-Up Training Review: Battlefield Lessons Learned."Military Medicine. 2011;11:1311.